CLAIMS

We claim:

1. A method of regulating landfill gas well production comprising:
   a. installing a constant flow control wellhead in a section of piping between each well, or grouping of wells with a single extraction pipe, and the well extraction vacuum source,
   b. opening a differential pressure-regulating valve in the wellhead gas path to a nominal position,
   c. opening a manual valve in the same wellhead gas path partially,
   d. measuring the differential pressure across the differential pressure-regulating valve,
   e. adjusting the manual valve position to set the desired differential pressure across the differential pressure-regulating valve,
   f. measuring the differential pressure across the complete wellhead assembly,
   g. adjusting the differential pressure-regulating valve, as needed, to maintain the desired differential pressure across the complete wellhead assembly,
   h. measuring the gas composition of each landfill gas well on a periodic basis,
   i. re-adjusting the differential pressure-regulating valve position periodically, if needed, using the result of the gas composition measurement to determine the desired direction of adjustment,
   j. measuring the adjusted differential pressure across the differential pressure-regulating valve,
   k. adjusting the position of the manual valve to obtain the desired differential pressure across the differential pressure-regulating valve,
   l. measuring the adjusted differential pressure across the complete wellhead assembly, and
   m. adjusting the regulating valve, as needed, to maintain the desired differential pressure across the complete wellhead assembly.
2. The method of claim 1 further comprising adjusting the manual valve position to set the differential pressure-across the regulating valve within a range of 1 to 4 inches WC.
3. A landfill gas well extraction control system comprising:

a. means for opening a differential pressure regulating valve in the gas path to a nominal position,
b. means for opening a second valve in the gas path,
c. means for measuring the differential pressure across the differential pressure regulating valve,
d. means for setting the second valve position to obtain the desired differential pressure across the differential pressure-regulating valve,
e. means for measuring the differential pressure across the complete wellhead assembly,
f. means for maintaining the desired complete wellhead assembly differential pressure at a constant value,
g. means for measuring the gas composition of each landfill gas well on a periodic basis, and
h. means for adjusting, if needed, the desired complete wellhead assembly differential pressure.

4. A multiplicity of constant flow wellhead assemblies controlling flow through piping for a multiplicity of landfill gas extraction wells that use a common extraction vacuum source, each constant flow wellhead assembly comprising:
   a. a differential pressure-regulating valve connected to each well's extraction pipe,
   b. a second valve connected to the regulating valve on one side by piping, and connected on the other side by piping to the vacuum source, such that the vacuum applied to the regulating valve may be controlled,
   c. an upstream pressure tap located in the well pipe upstream of the pressure regulating valve,
   d. an intermediate pressure tap located in the pipe between the pressure-regulating valve and the second valve,
   e. a downstream pressure tap in the pipe arranged downstream of the second valve,
   f. a differential pressure measurement instrument providing display capability of the differential pressure between the upstream and intermediate pressure taps and the upstream and downstream taps,

g. an electronic control circuit connected to the pressure taps which controls the position of the pressure-regulating valve to maintain a desired differential pressure across the complete wellhead assembly, as measured from the upstream and downstream taps, and

h. a sample tap located in the piping such that a sample of the well gas may be obtained.

5. The wellhead assembly of claim 4 further comprising the differential pressure-regulating valve is configured such that at any initial valve position an increment of valve flap motion provides the same change in differential pressure.

6. The wellhead assembly of claim 5 further comprising gas stream temperature is measured upstream of the valves and is provided to the electronic control which closes the pressure-regulating valve in the event of high temperature.

7. The wellhead assembly of claim 6 further comprising a battery power supply for the electronic control circuit and valve position control.

8. A constant flow control wellhead assembly for a landfill gas well extraction system comprising:

a. A manually controlled valve providing an open position, a closed position, and a multiplicity of partially open valve positions, and connected such that all flow from the well passes through the valve,

b. a pressure-regulating valve connected upstream of the manual valve such that all flow from the well also passes through this valve,

c. a pressure tap in the piping upstream of the pressure-regulating valve and a pressure tap in the piping between the manually-controlled valve and the pressure-regulating valve such that the taps may be used to measure the differential pressure across the pressure-regulating valve,

d. a pressure measurement tap in the piping downstream of the manually controlled valve such that the differential pressure across the entire wellhead assembly may be measured,

e. a sample tap upstream of the pressure-regulating valve such that a sample of the landfill gas passing through the wellhead may be obtained, and

f. an electronic display and control circuit such that the differential pressure across the pressure-regulating valve may be displayed to set the desired position of the manually

controlled valve, and the differential pressure across the entire wellhead assembly may be displayed for use as a control parameter for the pressure-regulating valve.

9. The wellhead assembly of claim 8 further comprising the pressure-regulating valve flow area is configured such that at any initial valve position an increment of valve flap motion provides a linear relationship with the change in differential pressure.

10. The wellhead assembly of claim 9 further comprising the pressure-regulating valve internals include a flow area and a movable flap, the flap having range of movement from a closed position, that entirely covers the flow area, to a fully open position, that completely uncovers the flow area, and the flap has a straight lower edge, the location of the straight lower edge in the flow area defining the size of the open flow area through which fluid may traverse the valve, and the flow area having an upstream side and a downstream side, and the flow area is configured to provide the linear relationship between the difference in fluid pressure on the upstream side and on the downstream side and the position of the flap between the open and closed positions.

11. The wellhead assembly of claim 10 further comprising the pressure-regulating valve is positioned by an electronic signal generated by an electronic control circuit that uses differential pressure across the complete wellhead assembly as the control parameter.

12. The wellhead assembly of claim 11 further comprising gas stream temperature is measured upstream of the pressure-regulating valve and used in the electronic control circuit to close the power operated valve in the event of high temperature.

13. The wellhead assembly of claim 12 further comprising a battery power supply for the electronic control circuit.

14. The wellhead assembly of claim 13 further comprising the differential pressure-regulating valve is directly connected to the vacuum source and the manually controlled valve is upstream of the pressure-regulating valve.